Cursory assessment of disulfoton use in coffee in Puerto Rico

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Disulfoton is available only in the 15 % granular form for coffee production in Puerto Rico. It is registered under a section 24(c) label, for control of leafminers (larvae of the moth, *Leucoptera coffeella*). This insect, left uncontrolled, can cause up to 50 % reduction in photosynthetic activity and 40 % reduction in yield [1]. As such, this pest can pose a major economic problem, since coffee crops in Puerto Rico provide a gross income of approximately $ 30.3 million [3].

Of about 50,000 acres planted to coffee in 2000, approximately 15.3 % (7,636 acres) were treated with disulfoton [1]. The insecticide is also applied to plants in nursery production, with an unknown amount of the total product being treated. Treatment of coffee in the field is carried out exclusively by government employees (known locally as the "Brigades"), as this is cheaper for individual growers. Nursery applications are carried out by growers themselves [1]. Rates of application in fields vary according to the age of the plants involved. They are 0.25, 0.5 or 1 oz for newly planted, 2nd year, and "in-production" trees, respectively. This represents 20 lb (= 3 lb active ingredient), 30 lb (= 4.5 lb active ingredient), and 60 lb (= 9 lb active ingredient) per acre, of granular 15% disulfoton [2].

These estimates are based on an assumption of 1,000 trees per acre [2], though some newer varieties can be planted at 1,500 trees per acre. Fields with these (unspecified) varieties would require commensurately greater active ingredient [1]. Nursery applications are broadcast at an approximate rate of 0.5 gm (= 0.08 gm active ingredient) per plant. Plants in nurseries are kept in polyethylene bags, 3 – 3.5 inches in diameter and 10 inches deep [1]. All applications of disulfoton are made using a bucket and spoon. This is their time-honored method, and has been used for about 37 years [1]. Early attempts to use a "Swiss-Mix", a belly-grinder type of spreading device used in Puerto Rico to apply aldicarb, were unsuccessful, due to rapid damage of the mechanism from the abrasive disulfoton granules [1]. Growers and extension staff appear receptive to

alternative, more closed, systems of application. It is noteworthy that the application rates quoted above are based on efficacy studies done in the 1950s, by Puerto Rican scientists who used a 10 % granular formulation of disulfoton [2], as opposed to the currently used 15 % formulation.

Aldicarb (Temik) is the only currently available alternative to disulfoton in this crop that is believed to have some effectiveness against leafminers. It is considered by growers and extension service staff to be less effective than disulfoton, and was applied to only about 3,500 acres in 2000 [1]. Aldicarb is also "slightly more expensive" than disulfoton [1]. Azadirachtin is also registered for use against leafminers and a variety of other insects in coffee, but is unlikely to be as beneficial as disulfoton, since it has no systemic residual activity, and breaks down on plant surfaces rapidly. The extension service staff that were consulted do not list it as a control option for coffee growers in Puerto Rico [1].

Sources

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3. Office of Agricultural Statistics (OAS). 1999. Gross farm income of Puerto Rican agriculture; 1997-1998. Puerto Rican Department of Agriculture, San Juan, PR. Pp 20-21.